

## ABSTRACT

Methods, apparatuses, and systems for encoding information symbols comprising loading information symbols into a data array with  $n^{(1)}$  rows and  $n^{(2)}$  columns, wherein

5 each column has  $k_i^{(1)}$  information symbols, and wherein  $k^{(1)}$  is an array that has at least two different values, encoding each column with a code  $C_i^{(1)}$  from a family of nested codes  $\mathbf{C}^{(1)}$ , wherein  $\mathbf{C}^{(1)}$  includes two different nested codes, and encoding each row with a code  $C^{(2)}$ .